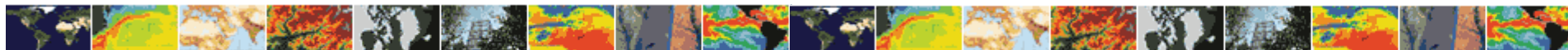




ESDS Reference Architecture

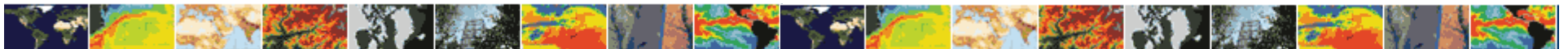
Introduction and Status
ESDSWG Meeting
Newport News, VA
November 2, 2011





Agenda

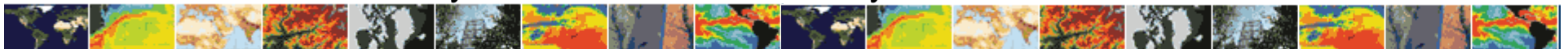
- Overview of Reference Architecture
- Immersion Exercise at ESIP meeting
- Feedback Review





Effort and Scope

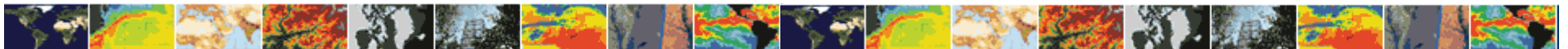
- Why do this?
 - Build a common understanding of NASA's ESDS
 - Decadal Survey Missions
 - Interoperability momentum
 - SPG efforts
- Scope
 - Future missions
 - Future data systems
 - Lifecycle – 15 years?
- Teams
 - Writing – Barry Weiss, Emily Law, Michael Burnett
 - Rich Ullman
 - Review
 - Siri Jodha Khalsa, Marilyn Kaminski, Jeff Lee, James Gallagher, Patrick Denny, Helen Conover, Allan Doyle





Status

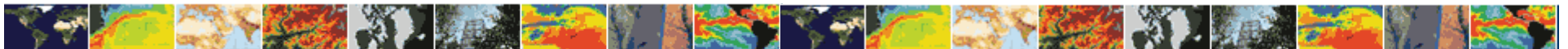
- This is not complete
 - Diagramming tool consistency
 - Technology View
 - User View
 - Others?





Approach

- Identify Reference Architecture Stakeholders
- Use Cases
- Architecture Views
 - Functional View
 - Information View
 - System Service View
- Mapping





Stakeholders of the Reference Architecture

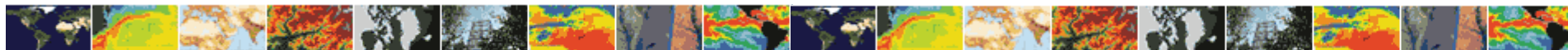
Stakeholder	Description	Concerns
System Architect	The System Architect is responsible for establishing the vision of a system that will meet specific needs (within a program), the approach for realizing that vision and ensuring that it is properly fielded. Normally this role is for systems targeting an operational capability instead of a short-term throw-away effort, for example, a prototype. The System Architect typically will evaluate the target system and put it in the context of the Reference Architecture, first ensuring that the Reference Architecture is pertinent, then understanding how best to leverage it.	<ul style="list-style-type: none"> · Scope of target system · Relationship to Reference Architecture (How does what I am responsible for building relate to the ESDS Reference Architecture? What can I leverage or reuse?) · Integrating with/extending Reference Architecture (How does what I am responsible for building work with other implementations of the ESDS?) · Information and standard reuse
Data Architect	Data Architects are responsible for information modeling within systems. They are concerned with capturing the information used within a system, from conceptual through physical deployment.	<ul style="list-style-type: none"> · Data (and metadata) exchange · Information model reuse
Program Management	Programs managers establish and track plans, budgets, processes and governance mechanisms within programs. These responsibilities begin during the Inception phase, where potential programs are conceived and funding decisions are made, through deployment and maintenance.	<ul style="list-style-type: none"> · Formulation of program vision · Scope of target system and its components · Cost estimation by reusing concepts, services, components and standards
Project Scientist	Individual responsible for defining and delivering the science mission requirements. Particular focus on understanding what resources (data, services, applications) are available to leverage and how to deliver new data to users.	<ul style="list-style-type: none"> · System architecture concepts · Leveraging existing systems and their components
Policy Researcher	Policy researchers are interested in higher level products and applications that can be used for analysis, decisions and formulation of policy.	<ul style="list-style-type: none"> · Leveraging existing systems and their components
Research Scientist	Individual or small team who use Earth observation resources in the pursuit of their own science goals. While the resulting science may be introduced into the system as shared resources that may not happen, or may happen very sporadically.	<ul style="list-style-type: none"> · Leveraging existing systems and their components
NASA Management	Responsible for mission fulfillment, policy adherence and budgetary concerns. These managers ensure that maximum value is being derived from existing investments. They identify high value areas of future investments and validate proposed solutions in the context of existing enterprise resources.	<ul style="list-style-type: none"> · Formulation of program vision · Enterprise Architecture, opportunities to optimize investments · Cost estimation by reusing concepts, services, components and standards



Use Cases

Define the Scope of ESDS's

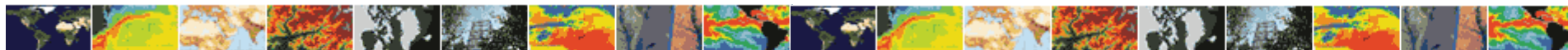
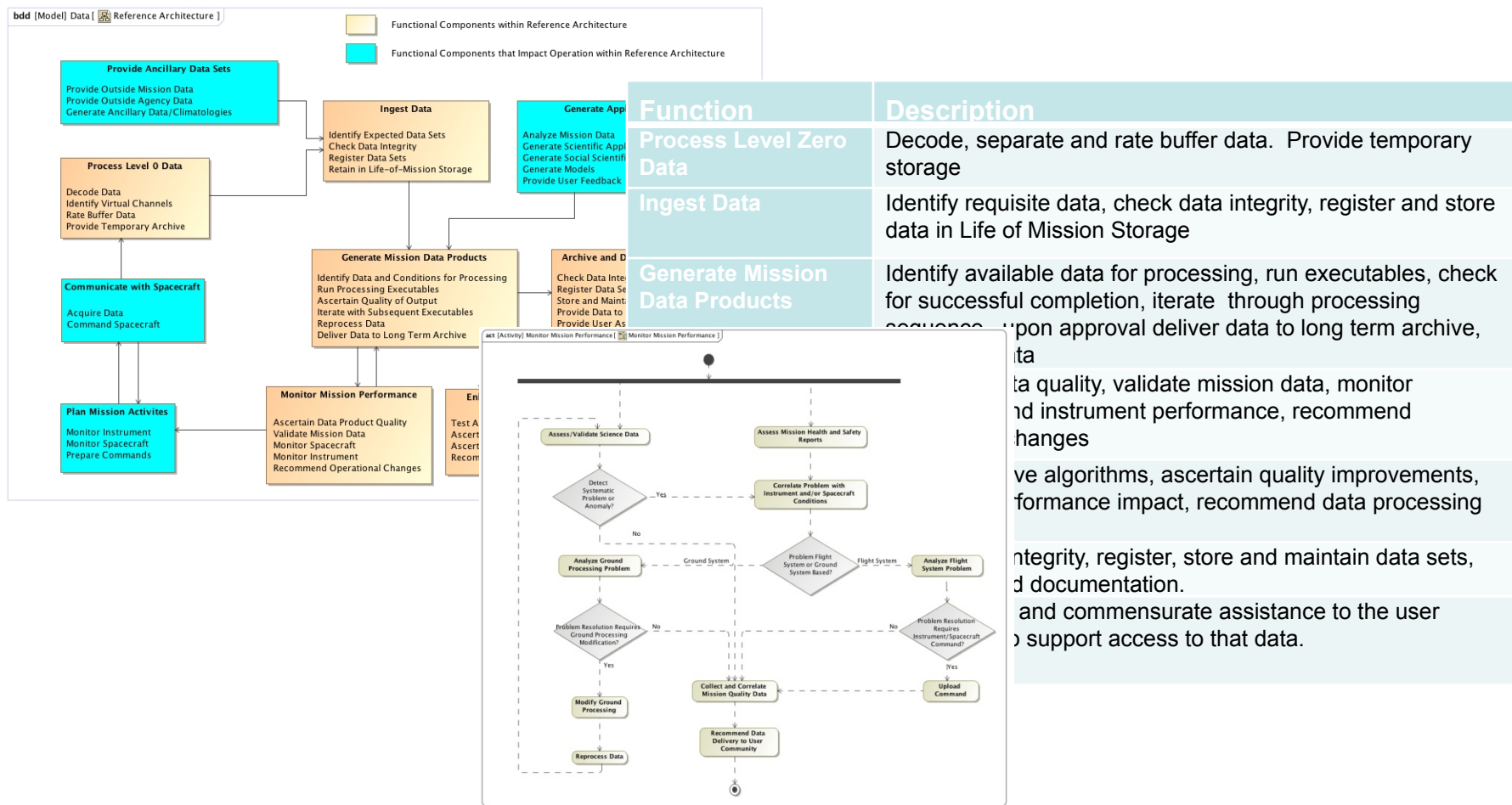
UC #	Name	Description	Stakeholders
ESDS-1	Receive Sensor Data	Remote Sensing resource sends data to Ground Systems.	System Architect Data Architect Project Scientist Data Provider
ESDS-2	Develop Products	Using algorithms and other services, data is transformed into higher value products.	System Architect Data Architect Project Scientist Data Provider Program Management
ESDS-3	Distribute Products	Generated products are made available to end-consumers. This includes the discovery and access of data using tools, as well as the actual delivery of data to endpoints.	System Architect Data Architect Data Provider Program Management
ESDS-4	Develop Predictions	Using data products and models, predictions are generated, saved and made available through the system, much like any other data product.	System Architect Data Architect Research Scientist Policy Researcher
ESDS-5	Manage Remote Sensor/ Instrument	The control and command of remote sensing resources.	System Architect Project Scientist Program Management NASA Management
ESDS-6	Data Stewardship	Keep data resources preserved and available for the long term (beyond mission life).	System Architect Data Architect Data Provider NASA Management





Functional View

Define the primary functions of ESDS's

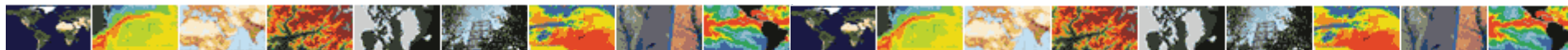




System Service View

Identify common high-level system services

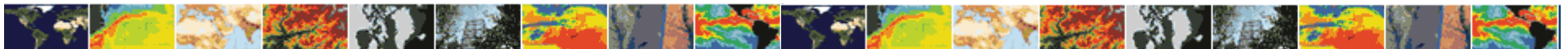
System Service	Type	Description
AccessData	U/S	Provides mechanisms for users and applications to retrieve data they identify, moving copies of the data of interest from ESDS resources to their own. These services may provide some data manipulation capabilities, where data is transformed before being delivered to users.
AnalyzeData	U	Provides capabilities for users to study and manipulate data.
AuthorizeUser	U/S	Determines whether or not a user has access to a managed resource, based on system policies.
DiscoverData	U/S	Provides the mechanisms for users and applications to find requisite data resources (both Collections and Granules)
DiscoverService	U/S	Provides the mechanisms for users and applications to find requisite Services.
GenerateReport	S	Provides access to a set of reports (including ad hoc?) that indicate state and trends of the ESDS.
IngestData	S	Provides mechanisms to move data into the ESDS, or move data from one component to another within ESDS instantiations.
InspectData	U	Provides a mechanism to retrieve a data object's metadata, for the purpose of understanding its applicability without actually having to retrieve the entire data object.
InvokeService	U/S	Provides a mechanism to execute a published service on behalf of a user.
Login/Logout	U/S	Initiates or terminates a managed session with an ESDS.
ManageResource	S	Provides mechanisms to control computing resources that support the operation of ESDS components.
MonitorStatus	S	Provides mechanisms to observe the state of resources within the ESDS or individual components in the ESDS.
ProcessData	S	Provides capabilities to process existing data and generate new data by executing a set of algorithms.
PublishData	S	Makes data resources publicly available.
PublishService	U/S	Makes service resources publicly available.
Subscribe	U	Services that publish events as well as enable users to request notification or a predefined action taken, upon the occurrence of the stipulated event.
TransformData	U/S	Services that operate on data. TransformData services typically convert data from its original state to something more appropriate and/or usable for an end-user's application. Examples of TransformData services include subsetting, subsampling and reprojection.





Immersion Exercise

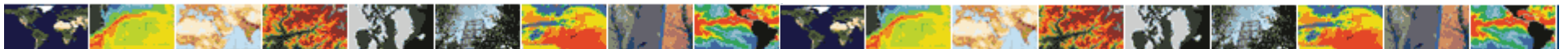
- Exercise Goal
 - Rapidly familiarize SPG members with contents of the Reference Architecture
 - Leverage the experience of SPG members to improve the Reference Architecture
 - Acquire feedback from multiple perspectives
- Guidelines
 - Reference Architecture team will assign each attendee to a stakeholder group
 - Those who would prefer representing a different stakeholder may attempt to trade
 - **No Bailing – you must get a replacement!!!**
 - Organize in small groups that represent each stakeholder. The groups will investigate the Reference Architecture from that stakeholder's perspective
 - The following slides contain questions each group should address
 - Each group should collect notes to share
 - Each group should select a representative who will present findings
 - You have 45 minutes! Go!





ESIP Meeting Feedback

- 89 comments received
 - 30 General
 - 19 Use Cases
 - 16 Functional View
 - 12 Information View
 - 11 System Service View
 - 1 Technology View





Results

- Top priority issues being worked
 - Security
 - Real-time access
 - Technology View
 - Reevaluate Context of Functional View
 - Modeling/Predictions
- Key Strategic Issues
 - Retaining level of abstraction
 - Living document, but baseline needed
 - A number of separate, but dependent papers have been identified

